Executive Summary

The City of Evansville (City) hired Vierbicher Associates, Inc. (Vierbicher) to complete a lake restoration plan for Lake Leota. The lake has been drained since about 2006 and the City and local residents want to consider alternatives to enhance lake-based recreational opportunities. Alternatives the lake restoration plan should consider include creating deep fishing areas in the lake, protecting the shoreline from erosion, and reducing sediment movement downstream into Allen Creek. Removing and disposing of material from the lake bed requires a detailed plan that would need to meet the approval of regulatory agencies and the limited funding capabilities of the City.

Vierbicher prepared a preliminary lake restoration plan and presented it to the City during the consultant selection process. This preliminary plan was also later presented to the Save Our Lake Environment (SOLE) members at one of their meetings. After these initial reviews, the lake restoration plan was revised and again presented to the City and SOLE for review. In addition, this revised plan was presented to local land owners to discuss opportunities for land disposal of the removed lake bed material. Land owners understood the plan's proposed land disposal of lake bed material and appeared willing to consider this option given the thin depth and acceptable quality of the lake bed material. The revised plan was also presented to staff from the Wisconsin Department of Natural Resources (WDNR) to evaluate their primary concerns and to determine what information the plan would need to provide so that they could permit the proposed lake restoration.

The plan preparation and review resulted in a final restoration plan that depicts a lake with a 15-foot deep fishing area and an 8-foot deep recreational area. Both of these new enhanced areas are surrounded on three sides by wide shallow naturally vegetated shoreline wetlands and further protected from sedimentation by a new upstream 10-foot deep forebay. Gently sloping side walls provided around these deep lake areas will also help protect the shoreline from erosion. Removal of about 200,000 cubic yards of material from the lake bed is required by this plan. This lake bed material is proposed to be disposed of in thin layers on private undeveloped uplands along the western edge of the lake. The lake restoration plan describes disposal of lake bed material on 165 acres of land at a uniform depth of 9 to 12 inches. This lake bed material would be dumped from all terrain trucks in uniformly spaced piles and then later after drying out it would be spread evenly over the land surface with a bulldozer. The lake bed material would then be incorporated into the soils during seasonal agricultural activities such as plowing, tilling, and seeding without serious disruption of usual crop production. Where future land uses are changed from agricultural, such as new residential housing developments, the lake bed material would easily be converted into lawns and landscaping.

Total cost for the lake restoration plan is about $1.7 million if local land spreading is readily available. If road transport of the lake bed material to more distant quarries is required, cost for the project may reach $2.6 million. These cost estimates include a 10 percent contingency for increasing or changing construction costs and an allowance of 12 percent for required engineering and construction services. Based on sediment transport rates estimated for Allen Creek, the

enhanced recreational areas should not fill in for at least 15 years. Given improved erosion control practices in this primarily agricultural watershed these rehabilitated lake areas may not fill in for as long as 50 years.

Review by WDNR staff indicated they want to see a long period before lake restoration efforts need to be repeated. They also want to see improved water quality characteristics, such as enhanced wetlands and reduced frequency of algae blooms. They would prefer to see greater wildlife and fish use of the area. Also important to regulatory agencies is protecting fish resources downstream from Lake Leota by reducing erosion from upstream agricultural lands. The re-routing of stream flow back into the upper lake would help reduce the downstream movement of sediment as does the lake restoration plan's proposed construction of a sediment forebay.

If the regulatory agencies can permit the lake restoration project then substantial funding would need to be obtained to complete the work. The most likely source of funding would be from City taxes. However, contributions from SOLE, from private citizens and from local businesses would help with funding. In addition, grant programs from Federal, State, and local agencies and private organizations would be possible. Federal programs such as US Fish and Wildlife's Environmental Quality Improvement Program, State programs such as the WDNR's lake protection, wetland enhancement or storm water management programs, or from private organizations such as Waste Management Corp's, or Ducks Unlimited habitat enhancement programs would also be possible funding sources.

To complete the proposed project, two primary activities still must be undertaken: obtain regulatory agency permits and obtain adequate funding. The regulatory agency permits will be issued after sediment chemistry is verified, land use rights for spreading lake bed material are obtained, an adequate life expectancy for the project is demonstrated, and ample water quality enhancements are documented. The lake restoration project would also benefit greatly from increasing streamflow back into the upper portion of the lake. This flow redirection task will require close cooperation with the railroad and WDNR. Three permits will be necessary to obtain before construction can begin. These permits include a Chapter 30 lake dredging permit, a Notice of Intent (NOI) Storm water Discharge Permit for the lake bed material disposal site and a WPDES permit for waste water discharge from the lake bed material disposal site. Should the final lake restoration plan include multiple lake bed material disposal sites, each will require a NOI and a WPDES permit. Funding for the project will require consideration of all funding sources by the Evansville City Council. Funding sources to consider will include taxes, loans, grants, and voluntary contributions. One opportunity will be obtaining donations from local business and community leaders. Should permits and funding be obtained soon, the project could be completed during the winter of 2008 and 2009 when frozen conditions prevail. It is anticipated that about 20 to 40 working days will be required to remove the 200,000 cubic yards of material from the lake which would cause less land disturbance if done during the winter. In addition, about 10 working days will be required to prepare and remove access roads and to spread the lake bed material on the land. These work activities would be done during the fall prior to the winter and during the early spring after the lake work has been finished. Work in the lake should be finished so that lake filling can begin with the spring snow melt.

Vierbicher's current contract with the City is to prepare a lake restoration plan, estimate the costs of completing the construction associated with the plan, and to review the plan with the City and

WDNR. We have reviewed permit requirements with regulatory agency staff and prepared preliminary permit applications, but the submittal of these permit applications and any application review fees will be the responsibility of the City. In addition, the collection of additional sediment samples and their analysis, as required by WDNR to obtain a permit, will also be the responsibility of the City. The design of a new culvert or bridge under the railroad tracks to re-connect the upper lake to Allen Creek is an excellent idea and one supported by the railroad, SOLE, and WDNR, but this work is outside the scope of our current contract. After the City has reviewed and approved the Lake Leota Restoration Plan, the required design work for a new culvert or bridge and for construction related engineering and bidding services can be negotiated.